

Title (en)  
A MULTI-LAYER COATING

Title (de)  
MEHRSCICHT-BESCHICHTUNG

Title (fr)  
REVETEMENT MULTICOUCHE

Publication  
**EP 2011184 A1 20090107 (EN)**

Application  
**EP 07724523 A 20070424**

Priority  
• EP 2007003593 W 20070424  
• EP 06008678 A 20060426  
• EP 07724523 A 20070424

Abstract (en)  
[origin: EP1850412A1] A multi-layer coating for protection of metals and alloys against oxidation at high temperatures in general is provided. The invention utilizes a multi-layer ceramic coating on metals or alloys for increased oxidation-resistance, comprising at least two layers, wherein the first layer (3) which faces the metal containing surface and the second layer facing the surrounding atmosphere (4) both comprise an oxide, and wherein the first layer (3) has a tracer diffusion coefficient for cations  $M^{m+}$ , where M is the scale forming element of the alloy, and the second layer (4) has a tracer diffusion coefficient for oxygen ions  $O^{2-}$  satisfying the following formula:  $\frac{D_M}{D_O} \cdot \frac{p(O_2)}{p(O_2)_{ex}} < 10^{-13} \text{ cm}^2/\text{s}$  wherein  $p(O_2)$  is the oxygen partial pressure in equilibrium between the metallic substrate and  $M_aO_b$ ,  $p(O_2)_{ex}$  is the oxygen partial pressure in the reaction atmosphere,  $D_M$  is the tracer diffusion coefficient of the metal cations  $M^{m+}$  in the first layer (3), and  $D_O$  is  $O^{2-}$  tracer diffusion coefficient in the second layer (4). The coating may be used in high temperature devices, particularly for coating interconnect materials in solid oxide electrolytic devices, including solid oxide fuel cells (SOFCs) and solid oxide electrolysis cells (SOECs).

IPC 8 full level  
**H01M 8/02** (2006.01); **C23C 28/04** (2006.01); **H01M 8/12** (2006.01)

CPC (source: EP KR US)  
**C23C 28/04** (2013.01 - KR); **C25B 9/65** (2021.01 - EP US); **C25B 9/70** (2021.01 - EP US); **H01M 8/02** (2013.01 - KR); **H01M 8/0206** (2013.01 - US); **H01M 8/0215** (2013.01 - EP US); **H01M 8/0217** (2013.01 - EP US); **H01M 8/0228** (2013.01 - EP US); **H01M 8/0232** (2013.01 - EP US); **H01M 8/0236** (2013.01 - US); **H01M 8/0245** (2013.01 - EP US); **H01M 8/12** (2013.01 - KR); **H01M 8/1286** (2013.01 - EP US); **H01M 8/2425** (2013.01 - US); **H01M 4/9033** (2013.01 - EP US); **H01M 8/12** (2013.01 - US); **H01M 2008/1293** (2013.01 - EP US); **Y02E 60/50** (2013.01 - EP); **Y10T 428/24942** (2015.01 - EP US)

Citation (search report)  
See references of WO 2007121986A1

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

Designated extension state (EPC)  
AL BA HR MK RS

DOCDB simple family (publication)  
**EP 1850412 A1 20071031**; AU 2007241321 A1 20071101; AU 2007241321 B2 20100701; CA 2648740 A1 20071101; CA 2648740 C 20121023; CN 101438439 A 20090520; CN 101438439 B 20110202; EP 2011184 A1 20090107; JP 2009534538 A 20090924; JP 5382722 B2 20140108; KR 101278701 B1 20130625; KR 20080109084 A 20081216; KR 20120104439 A 20120920; NO 20084125 L 20081112; RU 2008138068 A 20100610; RU 2404488 C2 20101120; US 2010015473 A1 20100121; US 2015056535 A1 20150226; US 8859116 B2 20141014; WO 2007121986 A1 20071101

DOCDB simple family (application)  
**EP 06008678 A 20060426**; AU 2007241321 A 20070424; CA 2648740 A 20070424; CN 200780015128 A 20070424; EP 07724523 A 20070424; EP 2007003593 W 20070424; JP 2009506967 A 20070424; KR 20087027642 A 20081111; KR 20127021698 A 20070424; NO 20084125 A 20080929; RU 2008138068 A 20070424; US 201414480339 A 20140908; US 29845807 A 20070424